

# VISAGE: Visualization for Integrated Satellite, Airborne, and Ground-based data Exploration

Completed Technology Project (2016 - 2019)



## Project Introduction

A key component of NASA's Earth observation system is its field experiments, for intensive observation of particular phenomena such as hurricanes, or for ground validation of satellite observations. These experiments collect datasets from a wide variety of airborne and ground-based instruments, on different spatial and temporal scales, often in unique formats. The field data are often used with high volume satellite observations that have very different spatial and temporal coverage. The challenges inherent in working with such diverse datasets make it difficult for scientists to rapidly collect and analyze the data for physical process studies and validation of satellite algorithms, such as precipitation estimation. The VISAGE (Visualization for Integrated Satellite, Airborne, and Ground-based data Exploration) project will address these issues by combining and extending nascent efforts to provide a data-centric technology with on-line data fusion, exploration, analysis and delivery capabilities. A key building block is the web-based Field Campaign Explorer (FCX), due for beta release at NASA's Global Hydrology Resource Center Distributed Active Archive Center (GHRC DAAC) in mid-2017. FCX allows users to examine data collected during field campaigns and simplifies targeted and process-specific data acquisition for event-based research. VISAGE will extend FCX's capabilities beyond interactive exploration of coincident datasets, to provide integrated visualization, interrogation of data values, and basic analyses such as ratios and differences between data fields. Another key aspect of the VISAGE project will be incorporation of new, higher level fused and aggregated analysis products into the system from the System for Integrating Multi-platform data to Build the Atmospheric column (SIMBA), which combines satellite and ground-based observations into a common gridded atmospheric column data product; and the Validation Network (VN), which compiles a nationwide database of coincident ground- and satellite-based radar measurements of precipitation for larger scale scientific analysis. The VISAGE proof-of-concept will target Global Precipitation Measurement Ground Validation and precipitation analysis use cases, though reliance on standards will support broader use. "Golden cases" from GPM GV campaigns will be selected, and both field observation datasets and higher level products most relevant to these cases will be identified. Taken together, these components will support the display of multi-sensor observation visualizations, allowing data exploration in a single framework without worries of coordinate system inconsistencies or the complexities of reading multiple data formats. The multi-discipline research team includes developers of FCX, SIMBA and VN; and representatives of the GHRC DAAC which hosts the current FCX prototype and is the potential home for the proposed FCX enhancements as well as selected SIMBA and VN data products. The target user community is Earth scientists that require diverse measurements to help them address science research and analysis questions, as well as those who use numerical weather prediction models to conduct Earth Science investigations. The proposed capabilities have been identified as a need by VISAGE investigators from NASA's Precipitation Measurement Mission (PMM) Science Team, which has



VISAGE: Visualization for Integrated Satellite, Airborne, and Ground-based data Exploration

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destination	3

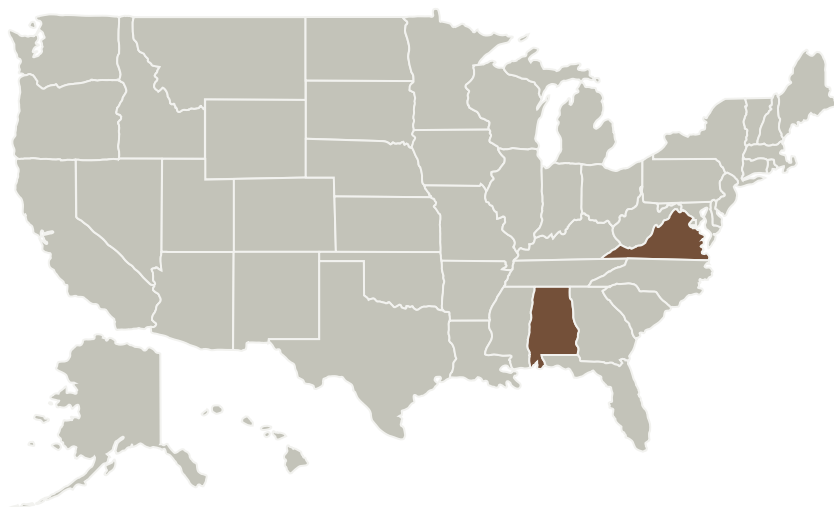
# VISAGE: Visualization for Integrated Satellite, Airborne, and Ground-based data Exploration

Completed Technology Project (2016 - 2019)



been tasked with using GPM data to better understand Earth's water cycle, weather and climate. Ultimately, technology developed for VISAGE will make Earth Science research more efficient. Its visualization and interrogation of diverse datasets will facilitate selection of weather events or features for study and assist with both qualitative and quantitative analysis of the measurements. VISAGE will assist researchers in quickly formulating and justifying science questions, reducing the amount of time spent on proposal development and speed publication of results.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
University of Alabama in Huntsville(UAH)	Lead Organization	Academia	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Virginia

## Organizational Responsibility

### Responsible Mission Directorate:

Science Mission Directorate (SMD)

### Lead Organization:

University of Alabama in Huntsville (UAH)

### Responsible Program:

Advanced Information Systems Technology

## Project Management

### Program Director:

Pamela S Millar

### Program Manager:

Jacqueline J Le Moigne

### Principal Investigator:

Helen T Conover

### Co-Investigators:

Walter A Petersen  
David B Wolff  
Todd A Berendes  
Aaron R Naeger  
Stephanie M Wingo  
Patrick N Gatlin  
Gloria W Greene  
Manil Maskey

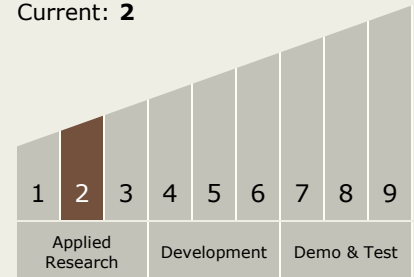
# VISAGE: Visualization for Integrated Satellite, Airborne, and Ground-based data Exploration

Completed Technology Project (2016 - 2019)



## Technology Maturity (TRL)

Start: 2  
Current: 2



## Technology Areas

### Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - └ TX11.1 Software Development, Engineering, and Integrity
    - └ TX11.1.7 Frameworks, Languages, Tools, and Standards

## Target Destination

Earth